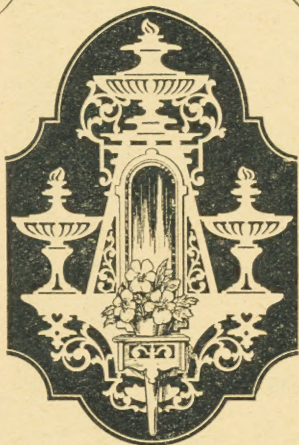


# Hobbies

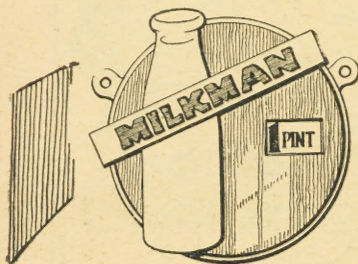
## WEEKLY



LARGE  
VASE  
HOLDER  
DESIGN  
FREE



MAKING A  
DUPLICATOR



Novel Milk  
Indicator

August 21st. 1937

Vol. 84. No. 2183

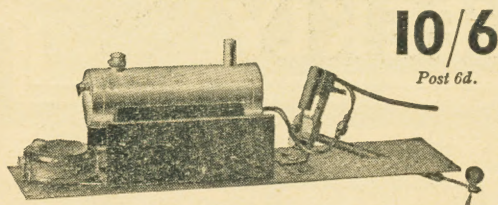
2<sup>D</sup>

THE FRETWORKER'S AND  
HOME CRAFTSMAN'S JOURNAL



# A Complete ENGINE UNIT for Model Boats

A powerful steam engine complete with propeller and shaft. Suitable for boats up to 30ins. long.



**10/6**

Post 6d.

Drives a 30in. boat for about 20 minutes on one filling. It has a polished brass boiler with a safety valve that really "works"—new safety type lamp fastening. An engine which is a real glutton for work, direct coupled to propeller. Mounted on metal base.

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# BRICK PAPER for Your Doll's House

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NEW and exclusive to Hobbies! In natural colours. Shown actual size. Bricks about one-half size of standard pattern paper. A big-seller. Ask for No. 163.

**1 1/2<sup>D</sup>. per Sheet 1/3 Doz.**

(Postage Extra).

The standard pattern brick paper. Shown actual size. No. 140 in natural colours. No. 140A, in bright red.



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Here's a clock you can't forget to wind! A clock that gives the right time...all the time. Yes—the spring-wound clock has served a useful purpose..but it is being superseded by the modern..more dependable electric clock.

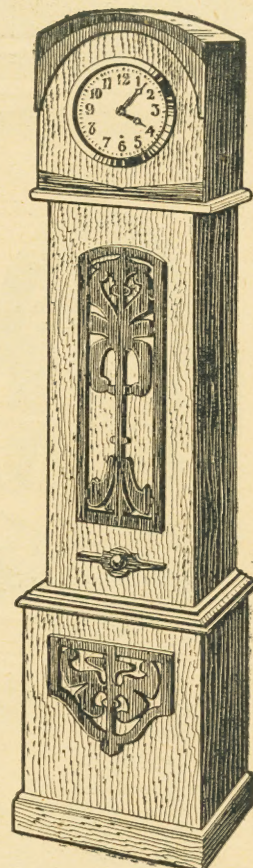
## The Modern CLOCK

Is your home on A.C. mains...200 to 250 volts? If so, you should decide at once to make this handsome electric grandmother clock. It is a perfectly straightforward job, and you will enjoy making it.

**200/250 volts  
A.C. Mains**

The design, No. 199 Special, costs 1/- and 1d. postage. The parcel of Oak, Plywood, Moulding, etc., costs only 11/6; postage 1/-, and the special Electric Clock movement ready-to-fit, and hinges and catch, 28/-; postage 6d.

Order from Hobbies Limited, Dereham, Norfolk.



**Make it  
Yourself !**





# Hobbies

## WEEKLY



August 21st. 1937

Vol. 84. No. 2183

SO many readers have written me asking how they can "run off" simple notices for club members, or how they can print 20 or 30 letters or cards that I have had a special article prepared on making and using a duplicator. It is a useful and practical piece of work which comes in on many occasions for scout troops, secretaries of League Clubs, School magazines and even printing handbills to advertise your work.

ANOTHER interesting little gadget in this issue is a Milk Indicator. Just the thing to make for any busy housewife, to hang outside for the milkman to know what he is to deliver. It is this type of novelty which can be made at any time and which sells readily at any bazaar or even amongst your friends. The price you can sell at largely depends, of course, on how nicely you have made the article, so it is always worth while paying attention to the finish. Bright colours of enamel always look attractive, but you can also leave the wood in its natural state if you have used a good quality fretwood. On the other hand, do not use plywood on any article to be hung in the open, because rain and sun soon draw the ply portions apart and ruin the piece of work.

THERE is apparently a big demand for ship models and the large number of our model galleons and old-time ships has proved very popular. Everyone will be delighted to hear, therefore, that I am having a large design sheet prepared for making a model of the "Cutty Sark." That famous old tea clipper—some of you on holiday may see her in Falmouth—had a very romantic career and is an undying example of the beauty and seamanship of the days of sail. The design and details for construction will appear in these pages next month, so be sure not to miss an issue. Tell your news-agent to save it.

THERE were not so many entries in the July Photographic Competition as I had hoped, and I expect to be able to give you the results next week. The judging had not been completed when these Notes were written.

WILL Alick Brudenell let me have his address please? He had asked me an electrical question and I cannot reply by post as this detail was omitted.

I AM continually hearing praise of the Low Wing Monoplane made from our Design No. 2121 and instructions. It was evidently a great success, and if anyone still wants to make it the Design is still obtainable for 4½d. post free. H. Hagan of Crawcrook, Co. Durham, won first prize with it at the Newcastle Model Aero Club Exhibition. He tells me it was greatly admired for its life-like design and reliability. You shall see a picture of the winner and cup and model later.

I HEARD a suggestion the other day which I thought might appeal to our camera users. It was that whilst on holiday—or at any time of course—pictures be taken of boats of all kinds. Thus one could collect a very interesting album of ships, linked up with places visited as reminders of happy times. There certainly could be a wonderful variety as a little thought will show you. You may not be able to snap the "Queen Mary," but

there are always heaps of other boats which make a varied range. The paddle pleasure steamer, the racing speed boat, the humble canoe are straightforward ones, whilst gradually you can add to your collection the boats of the Norfolk Broads, the sea-going yachts of the coastal towns, the creeping barges of the canals or even the quaint wicker coracles of the West. Put the date and particulars against each.

The Editor

### CONTENTS

#### GIFT DESIGN—Vase Holder

Hints and Tips	482
Fretwork Vase Holder	483
A Handy Duplicator	485
Nature Notes	486
Novel Milk Indicator	487
Interesting Snaps	488
Model Aircraft Notes	489
Hints on Gluing	490
Keeping Tortoises	491
Folding Picnic Table	492
Model Railway Dockside Lines	493
Hobbies Correspondence Club	494
Mysterious Puzzle Joins	495
Photographic Questions	496
Making a Sensitive Balance	497
Replies of Interest	501
Handy Vegetable Rack	503

#### Next Week's Design—Egg Cup Holder

Correspondence should be addressed to: The Editor, Hobbies Weekly, Dereham, Norfolk, and a stamp enclosed with the Reply Coupon from Cover if a reply is required. Particulars of Subscription rates, Publishing, Advertising, etc. are on cover iii.



Send your own simple tips to The Editor, Hobbies Weekly, Dereham, Norfolk. Keep them short and add rough pencil sketches if possible.

# HINTS AND TIPS



For original Tips published the sender will receive a Hobbies Propelling Pencil and Refills. We cannot acknowledge or print all tips sent in.

## Hammer Head Improvement

WITH the ordinary carpenter's hammer, it is often difficult to pull out longer nails without using wood blocks to raise the hammer above the surface of the board. A means of overcoming this, is to cut a semi-circular block



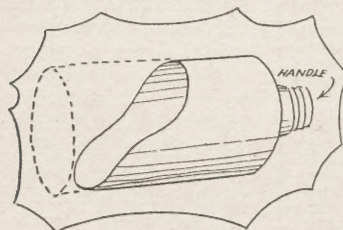
of wood from a  $\frac{3}{4}$  in. board as shown and drill a hole just a little smaller than the diameter of a  $\frac{1}{4}$  in. wood screw. Fasten the block to the hammer as shown. In pulling long nails leverage of hammer is automatically increased as the nail comes out of the board.—(G.K.)

## Hobbies Cover

READERS who bind their own "Hobbies," will find that if they do so with "Hobbies" leatherette paper, it will give quite a professional touch which is not there when done with ordinary paper. Also add the title part cut from the top of a cover of a "Hobbies." I have done four volumes like this, and they look very neat and attractive.—(W.F.)

## A Tin Scoop

HERE is a useful scoop for general household use or for experiments in amateur chemistry, etc. Cut shaded part off



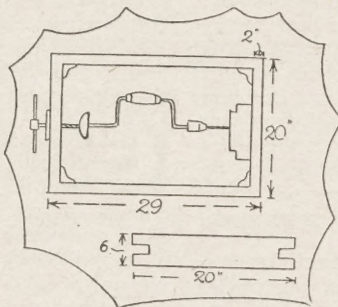
and your scoop will be complete using the top as handle. This is made from the ordinary metal polish tin or any one with similar lid and knob.—(H.J.)

## Modelling Masts

IF you want to sharpen dowels to a point evenly, such as the tops of masts of ships, etc., you will find that a pencil sharpener will do satisfactorily.—(J.A.C.)

## Drill Press

HERE are details of a simple device whereby a hole can be drilled through metal with very little bother. To make it you want a piece of wood about 1ft. 8ins. long and 2ins. by 6ins. for the base, two uprights 2ft. 3ins. of 2ins. by  $1\frac{1}{2}$  ins. and a piece 1ft. 8ins. of 2ins. by  $1\frac{1}{2}$  ins. for top rail joined together by halving joint and base cut as shown. Then you require



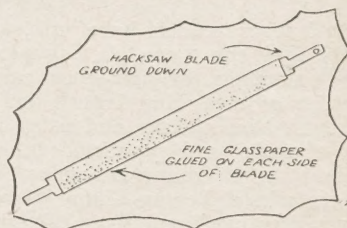
a piece of plate metal 2ins. by 4ins. by  $\frac{1}{4}$  in. with three holes bored through. The middle must take  $\frac{7}{16}$  in. bolt threaded right up to the top. Then you bore a  $\frac{1}{4}$  in. hole in top rail, screw flat in place, but you have to have the bolt turned down at bottom to a  $\frac{1}{4}$  in. diam. and  $\frac{1}{4}$  in. long to fit in the top of brace. At top of bolt you fit a piece of metal rod through hole which is bored  $\frac{1}{4}$  in. diam. Fix joints with screws and reinforce corners with brackets.—(D.R.)

## Fixing Horses

HORSES for the Coronation Coach from Hobbies design, can be made to stand by leaving the two legs, that touch the base about  $\frac{3}{16}$  in. or  $\frac{1}{4}$  in. longer. Then cut slots in the stand to take these and you will find this very effective and strong.—(G.B.)

## Sanding Blades

FOR sanding or cleaning intricate frets and similar work where the job would be tedious if done by hand, you can use these improvised sanding blades on



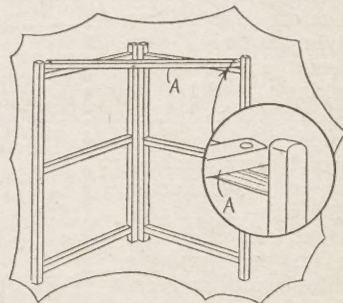
your fretmachine or in a hand-frame. They are made by grinding pieces of hacks and blades to the shape shown, and then cementing abrasive paper to both sides. Then the set is ready for use in the usual way.—(V.R.C.)

## Nails in Plaster

THE drawback and difficulty in knocking nails into plaster is that the plaster is liable to fall away. This difficulty can be overcome by heating the nail in boiling water.—(W.V.)

## Clothes Horse Improvement

HERE is a tip to improve a clothes horse. Obtain a piece of planed wood about  $\frac{3}{4}$  in. sq. and drill a hole  $\frac{1}{4}$  in. from each end with a  $\frac{1}{4}$  in. bit. Glue a piece of dowel rod in each hole so  $\frac{3}{4}$  in.



projects, as in diagram. Next drill a hole in the top of the two front rails of the clothes horse so the dowel rod can easily be fitted in. If the piece of wood used is about 3ft. long, it can be fitted on the clothes horse and the clothes can be hung on.—(E.B.)



# The FRETWORKER

THE patterns this week are of a large gift Design Chart for making another handsome Vase Wall Bracket. The finished article is shown herewith and it is constructed and easily cut with a fretsaw if you follow these instructions.

The patterns themselves are printed full size so there is no trouble with them. The materials needed are suitable fretwood and one each of the long special vases and mirror supplied by Hobbies. The best wood to use is whitewood and details of the mirror and vase are given in the Materials List herewith.

## Parts and Material

The work can be undertaken by a beginner as well as by the expert, because there is nothing in the cutting and construction which demands exceptional ability or trouble. The largest part is naturally the main back and although this measures nearly 16ins. long—the height of the complete article—the cutting of it is well within the scope of the owner of only a 12in. handframe because he can work from both ends and so complete the necessary cutting.

The parts concerned are in 3/16in. wood and this is quite nice both for cutting and for handling. All is supplied by Hobbies Ltd., and is beautifully planed and finished with a perfectly smooth surface.

Never commence work until you have got the grasp of how the article is made up, and always read through these instructions to know the correct sequence of the work before you undertake it. This will probably save you a lot of trouble, because you may have got so far and then have to take some of the parts to pieces otherwise.

## Study the Design

The first thing, of course, is to study the design sheet and note whether any parts want duplicating. This week, however, every one is shown separately so they can be cut out and pasted on to the piece of wood right away.

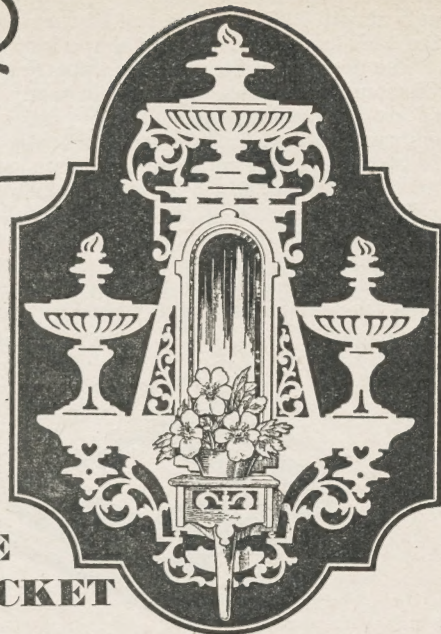
Remember to cut them with the grain of the wood running in the same direction as the arrows given on each pattern. In the case of the large

### MATERIALS SUPPLIED

**Fretwood.**—For making this Mirror Bracket we supply a parcel of Whitewood for (1/8 post free 2/-).  
**Fittings.**—A long bevelled mirror (No. 5724) 9d. New Style coloured vase (No. 6003) 9d. Postage on both 4d. Postage complete parcel of wood & fittings when sent together is 6d.

piece of paper for the back, this may be awkward to cut down perfectly, but a good plan is to turn it off to a round stick like a ruler and then to roll it on to the wood, as shown at Fig. 1.

Remember, too, it is always advisable to paste the wood itself, then you can get the patterns down more easily.



## VASE BRACKET

In every case, of course, the pattern must be put down perfectly flat, and all air bubbles pressed out. In the case of a large piece like the back, do not attempt to rub it down from one end to the other, but pat it from the centre outwards to the edges.

Neither should you be too rough with this in the use of a duster because, after all, the pattern is only thin, and a lot of rubbing is apt to split it or at least to stretch it a bit and so spoil the shape of the design.

## Treating the Patterns

All the patterns can be pasted down at once and then by the time the largest one has been put on the first one will be dry enough to commence cutting.

Do not put down the pattern and then attempt to cut it right away. If you do the paper is sure to tear up when the saw goes through it, or the cutting lines would become obliterated by sawdust.

The question of where to put drill holes is largely a matter of experience, but generally speaking one should be put in the centre of any fret pattern. In this way the blade can go down to the point of any angle and then be backed up to the hole mentioned, before turning and then cutting the opposite side of the angle to finish the part.

Do not be afraid to put in several drill holes, as these will frequently be the place when you can turn the saw, where otherwise you would have to take the blade a considerable distance.

## Hints on Cutting

As you proceed with cutting the wood out, notice not only the actual line you are following, but also how that particular fret appears in conjunction with the rest of the work. It must all



balance up correctly, and you will appreciate how ugly it will look to have one of the vases cut in the back larger or a different shape from the other.

The design, by the way, incorporates three conventional vases such as found in many examples of art and architecture. These vases with their embryo flame at the top are excellently shown in fretwork, but one must be careful in cutting the narrow portions which have no join at the top.

Follow the lines of the vases carefully and be sure to cut the top straight piece in line with each other at the two sides.

When the parts have been cut, clean them all up with glasspaper and if necessary use a small

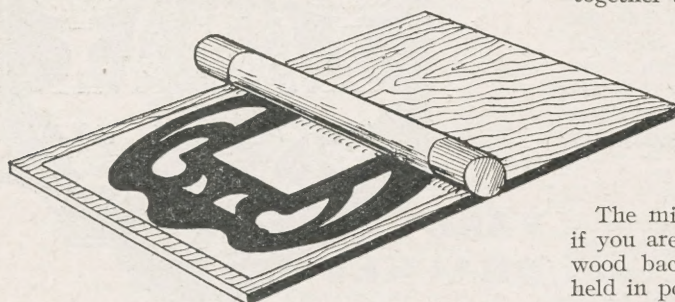


Fig. 1—Rolling a pattern off the stick on to the wood

fretwork file in the angles. The glass fits in the aperture in the back and is held there by the overlay rim. Each inside edge of this rim has to be chamfered and it is advisable to do this work—with a wide fret file—before cutting out shape. In this way you have a larger piece of wood to handle and so reduce the likelihood of damage.

When the overlay is glued up it is glued over the centre opening in the back with an equal projection all round. Do not, however, put the mirror in place until you have fitted in the shelf holding the vase.

#### The Vase Holder

The construction of this is given at Fig. 2, where the corner is cut away to show the interior. The various parts are cut from small pieces of wood of  $\frac{3}{16}$ in. thick. The top is actually fitted into the back by means of the mortise and tenon joint at A. As this is the means of providing strength, it must be made to fit tight when finally glued in place.

Beneath this shelf is the box like formation of the sides and a good plan is to construct this whole before finally fitting into the back. The two drop sides are fitted  $2\frac{1}{2}$ ins. apart and just allow the fretted front to go between. It is not in line with the side but slightly recessed. In order to hold the vase more securely a floor piece

is put in and this should not be glued until the sides fit. It can be measured in the actual position and so made to fit in quite tightly.

It is fitted just above the lower edge of the sides and is then glued in place. The position of the pins is shown on the design patterns.

#### Screw Holes

The better way is always to make the hole before driving in the screw or a nail. If the nail is used it need not be shown, because it can be nipped off with the shank close to the surface of the wood.

Test out all these parts before gluing them together and then, when the whole of the pieces are completed, fit them into the back by means of tenon A. Add glue also round the back edges of the other parts and press firmly home. If you have not made a satisfactory fit, screws can also be driven in from the reverse side of the back to provide certain strength.

The mirror is put in after all—after polishing if you are going to do that—and is fixed by thin wood backing, and then behind both parts are held in position by a piece of brown paper being pasted over tightly. Or, of course, if you prefer, photo clips can be used to hold the large backing piece.

#### Fitting the Vase

The vase, of course, is finally put in through the top and floor and the whole thing is hung by

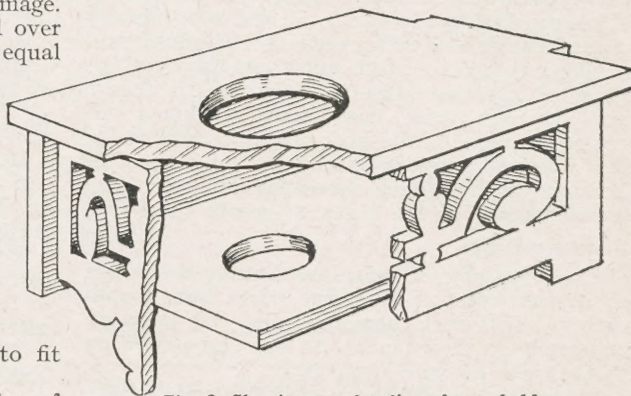


Fig. 2—Showing construction of vase holder

means of wall brackets. These should be fitted at the foot of each of the side pieces where there is  $\frac{3}{4}$ in. width of solid wood to screw the plates. It is not advisable to hang the article by means of any of the fretted pieces or the parts may become broken.

## OUR AUGUST PHOTOGRAPHIC COMPETITION

Don't forget to enter our summer contest with one or more of your holiday snaps. Prizes to be won in an Open and Junior Section for the best pictures of "Holidays." Special prizes also for Overseas readers. No entrance fee, no hard rules. Have your picture ready and send in before August 31st, according to rules in next week's issue.



# HOW TO MAKE A HANDY DUPLICATOR

MANY of our readers no doubt belong to a Club, or some similar organization such as Scouts, and judging from the many letters we receive, quite a number hold office as secretary (or whatever the fellow who does all the work happens to be called!).

Here then is a splendid piece of work they will especially appreciate. A novel duplicator that quickly and easily produces copies of anything from a business card to a magazine! And all self-contained in a neat little case.

One Scout Troop we know regularly produces an eight page paper of their proceedings on a similar machine. And all complete with a cover design by the troop artist in two colours, at that! But for less ambitious uses, like concert tickets and notices of forthcoming events, a press like this saves no end of the work, as well as putting a professional touch to it that is quite unobtainable with hand-written copies.

## How it Works

The principle of the press is quite simple. A sheet of stencil paper is written on (or typed), and then fixed in the press underneath a piece of fine cloth gauze. When ink is rolled on the gauze, some of it goes through the stencil on to the paper which is placed beneath.

The gauze, the stencils and the tube of ink are best purchased from a stationers. Ask for "Cyclostyle" materials when ordering, and you will experience no difficulty in obtaining them.

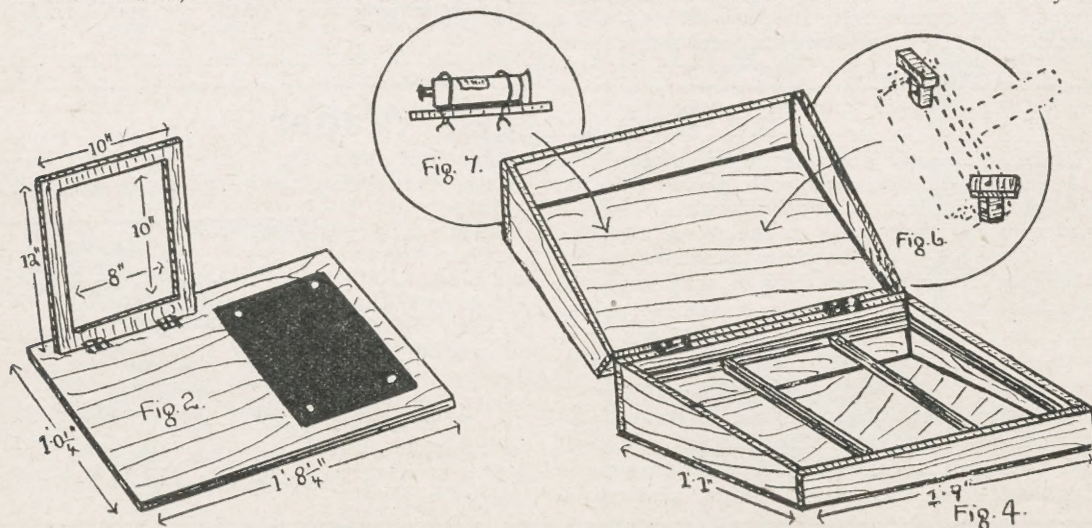
The construction of the set is in two parts. A board, on to which are fixed the stencil frame and the ink slab, and a case into which this lot



fits. Mahogany or light oak in  $\frac{3}{4}$  in. thickness are both excellent woods to use, the former looking especially well if finished off with Lightning Polish. Alternatively ordinary three-ply could be used to economise on outlay.

It is a good plan to mark out the sides of the case as though you were going to make a lidless box, mark off the ends and saw across at the angle, then saw the sides. Fig. 5 shows clearly how this is marked out. The angles in both box and lid are filled up with strips of triangular fillet, to give added strength.

A strip of wood  $\frac{1}{2}$  in. wide is fixed all round the inside of the case, 1 in. from the top, with two similar pieces fixed across, for the board to rest upon. This is clearly shown at Fig. 4. Fig. 6 shows how two turn-blocks are fitted in the lid to carry the





roller, and Fig. 7 how the tube of ink is carried. Either a simple catch or a lock can be fitted as required.

### Stencil Frame and Ink Slab

The Stencil frame is cut from a piece of wood 12 ins. by 10 ins., and hinged to the board as shown at Fig. 2. A piece of gauze slightly smaller than this is glued to the underneath side of frame. For the ink slab, thoroughly clean a piece of thin

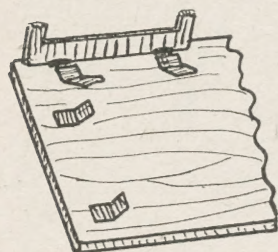


Fig. 3.

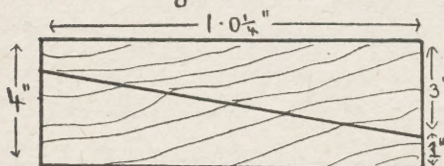


Fig. 5.

iron plate 10 ins. by 8 ins., and screw it on the board by the side of the frame.

As a guide to lay the sheets up to, four pieces of card are bent and glued to the board, underneath the frame, as shown at Fig. 3. The position of these will of course vary with different sizes of paper.

A roller for the ink can be purchased with the other materials, but one can easily be made up at home, from two pieces of dowelling, a piece of rubber hose and an odd piece of some hard wood. Push the piece of tubing over one of the pieces of dowelling (packing it to fit tight), as shown at Fig. 8. Cut a frame from the piece of wood and a handle from the other dowelling, and screw them

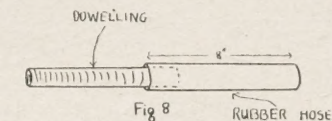


Fig. 8.

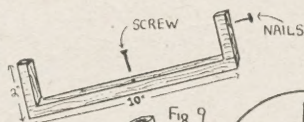


Fig. 9.

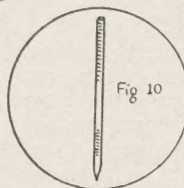


Fig. 10.

together as shown at Fig. 9. Now fix the roller in the frame by means of a short, big-headed nail through a hole in each end of the frame.

### Preparing the Stencil

For writing (or drawing) the original, a Stylo is required. These are also purchasable, but can easily be made by cutting a piece of bone or similar material into the shape of a pencil, as Fig. 10. If the original is typed, the ribbon must first be removed from the typewriter, so in either case the letters cut into the stencil.

When the original has been written (or typed) in this way on the stencil paper, fix it underneath the gauze with a few drawing pins. Put a little ink on the slab and roll it until a thin film of ink covers both slab and roller. Now put a sheet up to the guide cards, shut the frame down over it, and roll ink on the gauze.

For a start, until some of the ink has got through the stencil, you will have to roll quite a number of times, but after that once up and once down with the roller will be sufficient to print each copy. After use always clean all ink off the press with a little paraffin oil and a dry cloth.

### CUTTING LIST

No.	Description.	Length.	Width.	Thick.
2	Top and bottom of case	1ft. 9ins.	1ft. 1in.	1/2 in.
2	Sides of case ...	1ft. 9ins.	4ins.	1/2 in.
2	Ends of case ...	1ft. 0 1/2 ins.	4ins.	1/2 in.
1	Interior board ...	1ft. 8 1/2 ins.	1ft. 0 1/2 ins.	1/2 in.
1	Stencil frame ...	1ft. 0ins.	10ins.	1/2 in.
2	Interior supports for board ...	1ft. 8ins.	1/2 in.	1/2 in.
4	Interior supports for board ...	1ft. 0in.	1/2 in.	1/2 in.
—	Triangular fillet ...	10ft. 0in.	—	—
1	Roller ...	8ins.	1in. dowelling.	—
1	Roller handle ...	6ins.	1in. dowelling.	—
1	Roller frame ...	10ins.	2ins.	1in.

### NATURE NOTES

## The Red Legged Wader

THE red-shank is one of the most interesting of the waterside birds, with its red bill, and red legs which gives it its name. It is a wader in the true sense of the word, strutting along the banks of a stream or inland water with Victorian decorum, knee deep or even immersed to the body in its quest for crustacea bobbing about in the water, that have escaped floundering with the outgoing tide. Reservoirs are highly favoured by these long legged waders—they seem to relish probing about the large pavement for molluscs and crustaceans. Apart from the brilliant red of its appendages, the redshank's plumage is a drab-mottled grey with lighter underparts,

although it shows the lovely white of its underwings, when raising them high above its head to captivate its intended. The call at these times is thrilling, a sort of "te-leera, te-leera, te-leera," but with a musical plaintiveness that is above description. Its flight almost vertical, is also quite fascinating to watch.





# A NOVEL MILK INDICATOR

HERE is another household novelty which will prove very useful to the housewife. It is a circular indicator for showing the amount of milk required. All that has to be done is to turn the centre disc of the indicator until the quantity required shows through the oblong space in the front.

The article is made to look very attractive by having a fretted overlay of a milk bottle on the front and another with the word "Milkman" either painted on the face or made up in letters and stuck on.

Fig. 1 gives a good idea of the thing, which is intended to hang on the wall by two brass wall hangers.

The main construction consists of three circles all cut with the fretsaw as A, B and D Fig. 2. Disc A is cut from  $\frac{1}{4}$  in. wood, B and D from  $\frac{1}{8}$  in. wood, the overlay E which is fixed to the face of D is also of  $\frac{1}{8}$  in. wood.

## The Circle Parts

Having ready at hand the two pieces of wood for discs A and D, describe upon them with the compasses set to  $2\frac{1}{2}$  ins. radius, the two circles shown. Now take the other piece of  $\frac{1}{8}$  in. wood (which will be for disc B) and describe a circle with a radius of  $2\frac{3}{8}$  in. Cut all the circles with a fine fretsaw and clean up the edges with fine glasspaper.

Now, the disc B being sandwiched between the discs A and D, it must have a centre about which to revolve. This is formed by cutting a small disc from the centre of B and gluing it to A. In Fig. 2 the small disc, which measures  $1\frac{1}{8}$  in. in diam., is seen glued in place.

The best way to get this disc perfectly central would be to drill a small hole through the centre of A and another through the centre of C. Push a fine fretpin through A and then drop C over the top of it, a little glue having been previously put

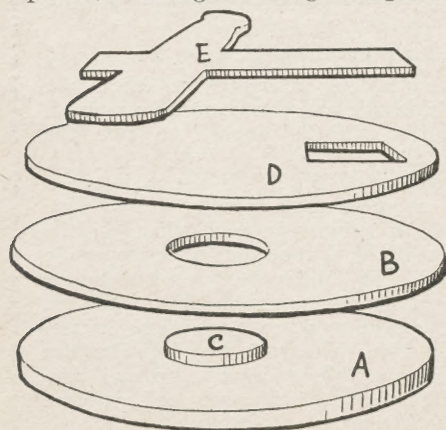


Fig. 2—The various parts required

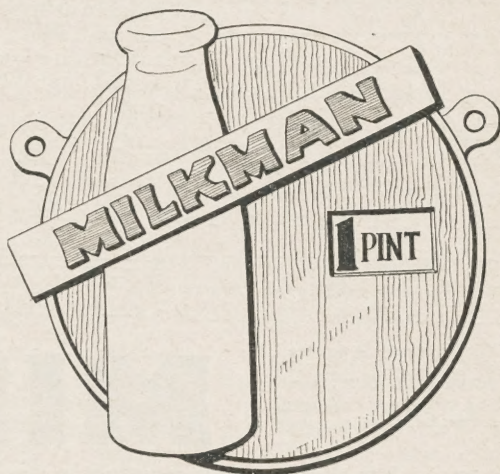


Fig. 1—The Completed Article

on the underside of the latter. You must, of course make sure of a perfect circle having been cut or it will not turn.

The opening, or window, in D must next be cut, and this is made to the measurements shown in Fig. 3. The circle, shown dotted, is first drawn to indicate where the inner line of the square comes.

Draw the long lines of the square parallel to the central dotted radial line. Cut the square out with a fine fretsaw, using a bevel cut so the actual top of the opening is larger than the bottom, this will give a better view of the figures and lettering beneath.

## Painted Finish

The painting of the figures and letters should be done in black enamel or ordinary paint. For setting out the positions of the figures, the seven squares shown in Fig. 4 must be drawn on the disc B.

First lay disc D over it and put a pin temporarily through the centre. Draw round the opening with a finely pointed pencil. Then turn

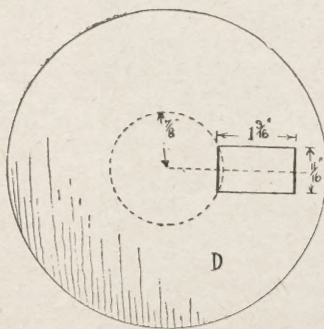


Fig. 3—A detail of part D with its window opening

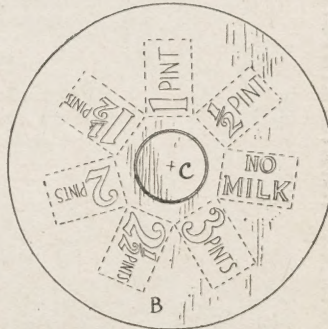


Fig. 4—The position of the measures on disc B



disc D round to the next position, allowing the two inner points of the squares to meet as shown.

Repeat this operation until all the squares are outlined, then carefully pencil in the figures and

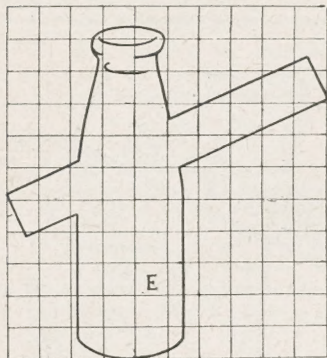
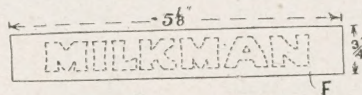


Fig. 5 (above) A squared drawing providing the shape of the bottle strip

Fig. 6 (right) The strip F and full size wording

words well within this opening. Paint in as suggested and allow to harden before assembling the parts.

Glue D to the smaller disc C after lightly glass-papering the



# MILKMAN

The main overlay is to be cut from  $\frac{1}{4}$  in. wood, 5 ins. by  $5\frac{1}{2}$  ins. and the squared diagram (Fig. 5) will assist in drawing the shape on to the wood. Half-inch squares must be drawn and the outline carefully followed through each. Cut round the outline with a fine saw and clean off the edges with fine glasspaper.

The upper overlay (F), which is in the form of a strip bearing the word "Milkman" is shown in Fig. 6 and it can be drawn direct from the dimensions given. The wording, as before mentioned, can be either painted on or the letters can be cut out separately and stuck on.

The word is given full size so it may be traced and transferred direct to the wood for painting or it may be stuck down to the wood and used just as it is.

In painting the article the top disc would look well if painted blue and the edge of the larger disc

larger disc B to allow it to move round not too easily.

A screw or two can be run in if desired to give added strength in holding the discs together.

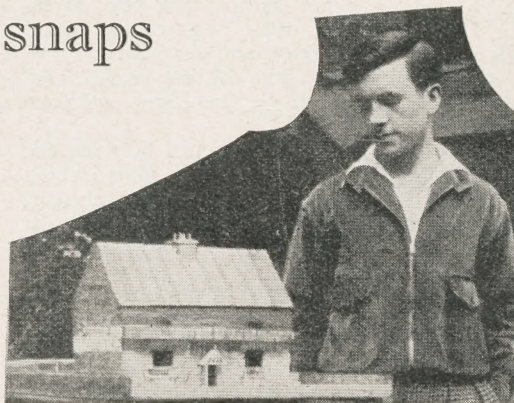
black.

Two brass hangers should be screwed to the back for hanging.

## Two interesting snaps

THE model house on the right is no ordinary building for it is built from about 10,000 matches. It is complete with tennis court and tea garden and was made by E. Ahronson of Bermondsey, London.

There was nearly a tragedy with it, too, because nine days before it was due to appear in an exhibition, a cat knocked it down and spoiled the whole thing! But our builder was a fellow not to be beaten, so he stayed up at night right through to the Exhibition date and just managed to get it done in time.



If any reader would like to buy it, by the way, he may be interested to know the model is on sale and can be seen on request. The Editor will be pleased to give the owner's address.

The picture on the left is also an interesting one as an example of what can be done with the fretsaw. It was taken on the occasion of the Coronation, of a procession held in Kedah, Malay States. The motor was decorated to represent the Coronation Coach and the woodwork was done in real fretwork style. We are indebted to Ibrahim Baba for the interesting picture and congratulate him on the ingenuity and excellent work displayed.



## NOTES AND NEWS ITEMS

# MODEL AIRCRAFT TOPICS

### The 'Semi-Scale' Class of Model

THE majority of model aeroplane designs fall into two extreme groups. There are machines built for maximum duration of flight, and in which little, if any, regard is paid to realistic appearance. And there are so-called flying scale-models of various full-scale designs, in which appearance is all-important, and the length of flight somewhat modest.

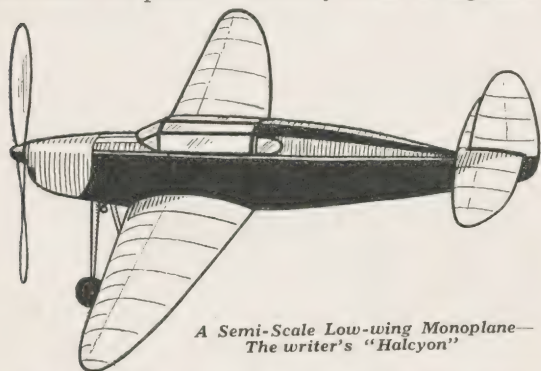
Between these extremes comes the neglected, but extremely useful 'general-purpose' class. Models of this type usually consist of a more robust version of some duration design.

As already explained, the proportions of the average model differ radically from those of the full-scale aeroplane. The stilty undercarriage and

enough to fly really well. The wings and fuselage should be covered with bamboo paper, which is much tougher than Japanese tissue, or even with silk. Two coats of clear dope, one or two of coloured, and a final application of banana oil give a highly-finished appearance, and immunity from the slackening effects of damp.

The wing needs to be nearer the nose than for the duration model, the propeller diameter less, and consequently the undercarriage shorter. These points make it harder to keep the rear of the model light, but the tail-plane and fin can be slightly reduced in area, and Mikasa tissue substituted for bamboo paper.

One coat of clear dope, one of coloured, and one of banana oil should suffice. Do not try to build a semi-scale model much less in span than 3 ft.



A Semi-Scale Low-wing Monoplane—  
The writer's "Halcyon"

large propeller, together with the semi-transparent nature of the light Japanese tissue used for covering, impart a somewhat toy-like appearance.

The writer has always felt that many more people would be attracted to model aircraft construction if they could see more models in which a compromise had been struck between the realistic appearance of scale types and the fine performance of duration types.

One was delighted to note that at the recent Gala Meeting—one of the most popular of the 'annuals'—held by the 'Northern Heights Model Flying Club at Fairey's Great West Aerodrome, a Coronation Cup was awarded for 'semi-scale' models.

It was won by Mr. C. Rupert Moore with a magnificent monoplane interceptor fighter 'Viper.' With a wing-span of 4 ft., a weight of 20 oz., and a vast amount of realistic detail, the duration was no less than 70 seconds, the speed 18 miles-per-hour, and the climb of true interceptor quality.

### Semi-Scale Construction

WITH the aid of hard balsa, used in stout sections, and not too sparingly, it should be possible to produce a fine semi-scale model light

### Scale Models

A CONTEST for flying scale-models, held on the occasion of the meeting referred to, resulted in the first three places going to three De Havilland Leopard Moths, one of them the fine 5 ft. span machine which holds the British record for the class with a flight of 45 seconds.

There was also a delightful little Hornet Moth biplane, with gracefully-tapering wings doped white, and having a flying performance in keeping with the attractive appearance. On view (but not flown in the contest) was a 10 ft. span Percival Mew Gull, fitted with a 9cc. petrol engine.

### New Petrol-Model Record

AT last Capt. C. E. Bowden's petrol-model record of 12 min. 48 secs. 'out of sight,' made in 1934 with his 'Blue Dragon' tapered high-wing monoplane, has been broken.

The new champion is Mr. A. T. Fraser, his model being a straight-chord high-wing monoplane, 'Comet II,' constructed by himself, and designed by Mr. A. T. Brooks. It took off from Kingsdown, in Dorset, on the evening of April 28th, and climbing rapidly to about 2,000 ft., disappeared from sight after a flight of 16 minutes 25 seconds. It was eventually found quite undamaged, and returned to its owner.

### The Mighty Atom

MENTION has already been made of the fact that tiny petrol engines are now being produced, having the same reliability as the 30cc. and 15cc. types in vogue two or three years ago, when models needed to be anything from 10 to 15 feet in wing-span. Recently one saw the 2½ oz. engine of 1.75 cc. designed and built by Mr. R. J. Trevithick. It has been installed in a parasol monoplane only 3 ft. in span.

Airman



# SOME HINTS ON GLUING



**A**LTHOUGH many books are written on the subject of woodwork it is very seldom one finds any explanation of ways to overcome troubles one unexpectedly comes up against when making things. These troubles are only found out during practical experience but in this article we are going to help you to avoid some of them.

It often happens that, to obtain a wide board, two pieces of wood have to be glue jointed edge to edge. Whether the joint is dowelled, rubbed or slot screwed together the same method applies

no air space between any part of the joint and this is only achieved by carefully planing until one piece stands on the edge of the other so no light can be seen through the joint anywhere.

When planing, keep testing side with straight-edge to see that both boards are in line with each other.

Any sappy edges of the wood should not be used in the joint because glue will not grip them. Sappy edges can be seen because they are usually lighter than the rest of a board.

The job must be done quickly with the glue hot and thin. The secret of a good job is to apply the glue quickly, put top board on bottom and rub joint together to exclude all air and to work the glue into the pores. If you wobble a board in so doing the air will get in, so remove and glue again.

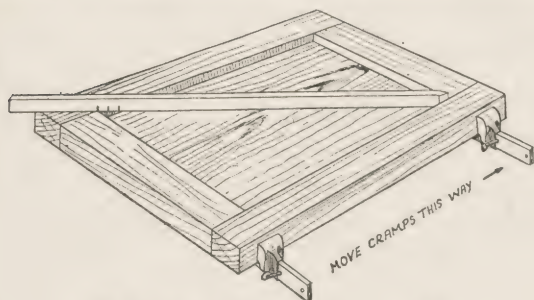


Fig. 1—How to use a "squaring rod"

i.e., the two edges are planed straight, the glue applied and cramps applied.

Now for the snags! How many of you dare, after such a joint is dry, strike it hard with a hammer without fear of it splitting? You should be able to. Also, how many of you have found that your joints "fly" some time after the article has been finished?

Here are the reasons for these snags. Novices are inclined to make the joint fit by screwing the cramps tightly after gluing but it should be planed to a perfect fit in the first place. There should be

## Test for "Squareness"

All articles such as frames, doors, carcasses, etc., should be tested for "square" immediately they have been glued up. If cupboards and doors are glued up carelessly, although they are the correct sizes, they will not fit together.

Use a "squaring rod" (a long strip of wood pointed at one end), put it across each diagonal of the frame as in Fig. 1, and mark the length. If there is any variation the frame cannot be square because in any such figure the diagonals should be equal.

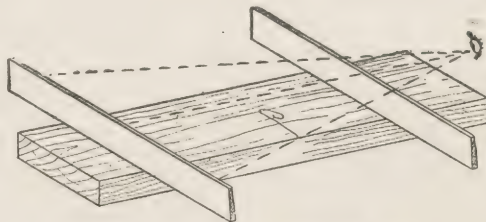


Fig. 2—A test with "winding strips"

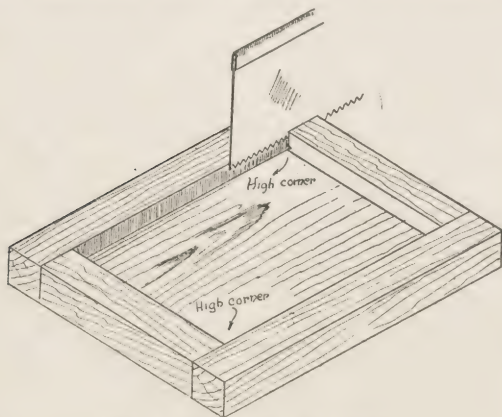


Fig. 3—Overcoming a "twist"

The squareness can be adjusted by moving the cramps slightly as in the sketch or the longer corners can be struck with a hammer. Note the direction to move the cramps. If the cramps need to be moved before the glue has set nail a triangular brace across the frame to keep it in place.

Making twisted doors and frames is another common failing with amateurs and doors that twist cannot be fitted in flush with the frame so they always look unsightly.

Twisting is due to one of two things. Firstly,



the wood may be twisted in itself and this should be planed flat before jointing is done or it will be a job to put right afterwards. Test face sides of wood by using "winding strips" (parallel strips of wood) as in Fig. 2. By looking along the edges of these the twist is exaggerated and one can tell where to plane to flatten surface.

Secondly, the twist may be due to faulty cutting of the joints. If jointed with mortise and tenons the mortises may not be upright or the shoulders may not be the same length. If dowelled, the ends of the rails may not have been planed square. Nevertheless, if you do your work twisted, place it in the cramps ready for gluing and squared up. Then run a saw cut into the shoulders on the high corners as in Fig. 3, and cramp up again. It will be found to have improved but if it is not enough repeat the operation.

#### Wipe off Surplus Glue

Immediately you have glued up any job which is to be stained, wash off all surplus glue with hot

water because glue has a nasty habit of soaking into the wood where it is not wanted. If this is not done, small parts will remain white when the article is stained and the job will be spoilt.

#### Veneers

When gluing veneers always have everything at hand because speed is most essential. It is advisable to have gluing surfaces warmed before applying glue as it soon chills on a cold board.

The secret of good veneering is to soak face side of veneer in hot water, apply glue liberally, place veneer into position and squeeze out all air and surplus glue. This is done by rubbing over the surface with a veneering hammer or a scraper with rounded edge would do—and pressing from centre of veneer to the edges. If the glue begins to cool during the operation it is advisable to have a flat iron heated to press on the surface to re-warm the glue under the veneer.



## KEEPING TORTOISES

**A** TORTOISE needs little attention, and is one of the pets which if kept in the garden will look after itself. In the winter it disappears, and therefore needs no attention at all, for it goes off into a secluded corner and buries itself in the earth, to await the call of spring. Tortoises are long lived; we had one that was known to be twenty years old at least.

Tortoises can be bought as cheaply as sixpence each—the small ones. The best way to keep them is simply to put them in the garden and leave them to their own devices. A tortoise may disappear for days, perhaps weeks, but will generally turn up again.

The land tortoise, which we refer to, is an interesting creature, and will become to some extent tame. Some folk keep it in the house, but fail to feed it properly. It is wrong to assume that a tortoise will eat black beetles (cockroaches) and such-like creatures. Many an unfortunate tortoise has been starved to death owing to this misconception.

#### Food and Drink

The land tortoise, such as you may buy for a few pence or shillings, requires vegetable food such as sow thistles, lettuce, cabbage, dandelion flowers, and some specimens will also take bread and milk. The writer has watched a tortoise kept in a small greenhouse, and found that, day after day, he will eat a lettuce nearly half his own size. To keep one in the kitchen when plagued with cockroaches and expect the poor creature to live on such diet is wrong. Always keep a sunken pan of water for your tortoise, it likes a drink.

The water-tortoises are equally ill-used, many people offering them the wrong kind of food. It is essential to have a small pond in the garden if you wish to keep these pets. They cannot eat vegetables, their proper food being the live creatures they find in the water they live in. They are best fed in captivity by supplying them with little bits of raw meat, snails, worms, or remains of boiled cod or turbot. They are easily distinguished from the land tortoises by their more active ways and their ability to swim in water.

#### Training

Water-tortoises do not care to be always afloat, so there should be a piece of cork or some small island for them to rest upon when tired of swimming.

Tortoises are supposed to be stupid creatures, but they have been known to answer the call of their owner, and to recognise the hand that feeds them.

A tortoise can be an interesting pet if properly looked after. He requires little attention, and can be made perfectly happy in a garden, especially if you let him—or her—have a mate in the spring-time. You can distinguish the male tortoise—the land species—by its humped shell, quaint club-feet, and by its underside being saucer-shaped; the female is similar in appearance, but the underside is flat.

There are several kinds of tortoises, the Grecian tortoise (the commonest land variety); the Brazilian tortoise; the American box-tortoise; the European pond tortoise; and the Bungoma river turtle, etc. All are long lived, and thrive well if their elementary needs are supplied.



# A FOLDING TABLE FOR CAMP OR PICNIC

**A**LTHOUGH campers, as a rule, enjoy roughing it in the fields when on a holiday and use the grass as a table, it often causes trouble when the grass is not level. Bottles, flasks and cups containing drink are easily upset and a small table for meals is really handy. The one illustrated has been designed to be as light and stable as possible as well as compact for carrying.

It weighs no more than a pound, and is only 20ins. by 10ins. in size when folded. It can comfortably be carried under the arm, strapped on to the bike or put in the car.

The top is composed of a centre piece of wood to which two flaps are hinged. The legs are hinged to the top so that they fold inwards. It will be noticed in the illustrations that the legs contain fretted patterns; this is done to render the table lighter rather than to decorate it.

## Materials

The wood should be of a reasonably light but strong kind such as sycamore. For the top obtain one piece 20ins. by 10ins. by  $\frac{1}{2}$ in. and two pieces 20ins. by 5ins. by  $\frac{1}{2}$ in. Each leg must be cut from a piece 9ins. by 10ins. by  $\frac{1}{2}$ in. Take care to buy

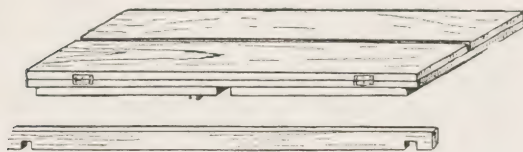


Fig. 2—The folded top, with loose rail

the legs so that the 9in. measurement represents the length with the grain to make the job stronger; it is wise to order one piece 18ins. by 10ins. by  $\frac{1}{2}$ in. and cut it afterwards to avoid any mistakes. The loose rail shown with Fig. 2 is 22ins. by 1in. by  $\frac{1}{2}$ in.

The only other materials required are three pairs of brass hinges  $1\frac{1}{2}$ ins. long.

## The Top of the Table

Carefully square the ends of the three pieces of wood which make up the top and make them all exactly the same length as each other. Then plane the edges of the two narrow pieces, if necessary, so that when they are laid together they measure  $\frac{1}{4}$ in. less in width than the centre piece; they will then fold easily when hinged.

Next mark out the hinge slots on one edge of each flap at distances of 3ins. from each end. They must be exactly the same in size as a plate of the hinge, cut them out accurately and screw the hinges into them. Then, by laying the hinged edge of each flap against one edge of the centre

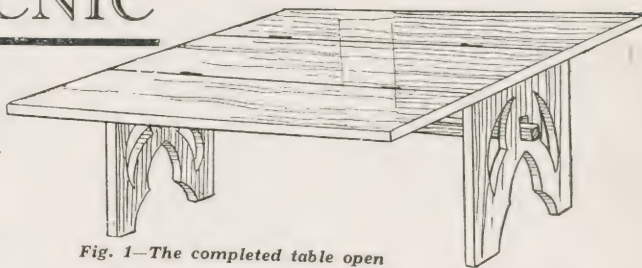


Fig. 1—The completed table open

piece the slots on that piece can be marked and cut to correspond. Screw the free hinge plates into these slots.

Then if the flaps fold nicely flat on the centre piece and if the joints are level when the flaps are extended the top is finished.

## The Legs

Plane the legs true to size and shape and mark out the pattern as shown in Fig. 3. The pattern can be easily drawn marked out if the wood is marked into 1in. squares and the points where the curves pass through the squares are marked on the wood corresponding with those on the illustration.

The oblong slot which is just above the middle of the leg must be marked and cut very accurately because the stability of the table depends on this. Cut out the frets very neatly and finish them with file and glasspaper.

The legs may then be hinged to the top; in this case it is unnecessary to chisel slots out to receive the hinges; they can be screwed on the surface. Fig. 2 shows clearly how this is done. Set each hinge 2ins. in from each end and only put one screw in each plate until you are sure the legs will fold properly.

To complete the table, the loose strip of wood in Fig. 2 must be prepared to fit in the slots in the legs. This strip acts as a straining piece preventing the table from wobbling when set up.

Being 1in. wide it will slide through the oblong slots in the legs easily. Two slots must, then, be cut into this piece so that they will fit tightly over the legs when pushed downwards in the leg slots. Make the distance between the slots a shade larger than the distance between the legs and make the slots  $\frac{1}{2}$ in. wide and  $\frac{1}{2}$ in. deep.

Cut them out carefully with a tenon saw and chisel. If you then stand the complete table together you will know if you have cut the slots well enough because if they are only slightly larger than the legs are thick, the table will be rickety.

(Continued on page 503)

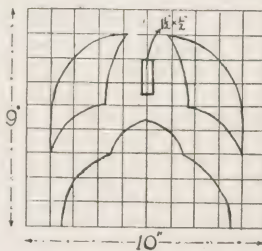


Fig. 3—Mark out the shape of the legs from this



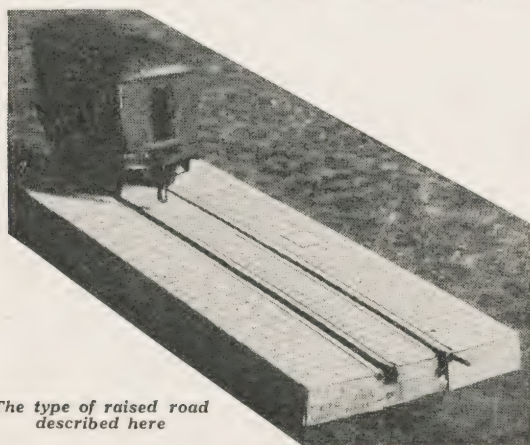


# Model Railway Accessories



**T**HERE is one type of track-finishing that is badly neglected by model railway owners and that is the kind known as "insetting." The inseting of rails means that the surrounding ground is brought up to the height of the rail-head, generally to allow the easy movement of passengers or carts.

All level crossings are laid thus, but this type of finish is used far more extensively than just at roads. Practically all dock and wharfsides lines are inset and so are many factory and goods



The type of raised road described here

yard tracks. The same finishing is occasionally found between platforms of terminal stations and partial inseting is common near engine sheds.

Model dock-side lay-outs call particularly for this type of track and the writer has seen several model wharfs, well made, with ships, cranes, carts, etc. absolutely spoiled by rails standing high up above road level, thus forming an impassable obstruction to everything else.

In proportion a tinplate rail and sleeper would form a barrier over 3 feet high if it were full size.

Model inset rails are, however, very easy and cheaply laid, being the one type that can efficiently be made of wood. Correct inset rails have of course the complete rails and sleepers below the surface, the top finish being of concrete or sets, over some suitable filling.

## Groove Rails

When modelling from wood, however, all that is necessary are two correctly cut grooves for flangeways. The wood used must be planed perfectly flat and should as far as feasible be free from blemishes. Also if any considerable lay-out is

## DOCK-SIDE LINES FOR GAUGE O

being attempted the piece of material upon which to work should be as large as possible. Thus a whole dock-side, of, say, two or three parallel tracks, could be cut on one piece with advantage.

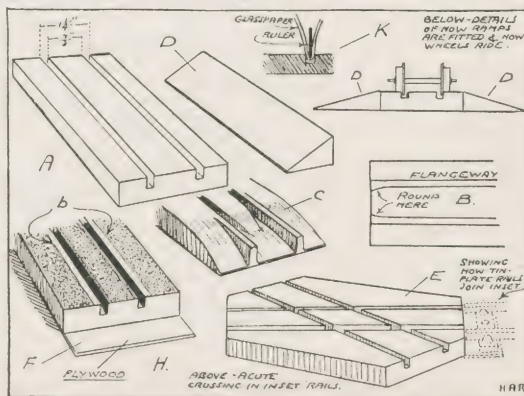
The flangeways are  $\frac{3}{16}$ in. wide and  $\frac{1}{4}$ in. deep. This is wider than scale, but is necessary when a variety of not precisely gauged vehicles are being used.

A straight steel-edge and sharp pen-knife are required for the cutting; keep a whet-stone handy and touch up the very point of the knife from time to time.

### Marking Out

Before starting to cut, the flangeways should be pencilled out very finely on the wood— $1\frac{1}{4}$ ins. between the outer edges and  $\frac{3}{8}$ in. between the inner. Now take the straight edge and run the knife, pressing heavily, along a line till a sufficient depth appears to be reached.

Now do the same with the line forming the further side of the flangeway. Next insert a chisel into one of the cuts at intervals and prize sideways. With care the whole section of wood so loosened will come out (if the cut is the same way as the grain) and a clear groove is left. If it is not deep enough a little more cutting and prizing will remedy this. Should the groove be slightly across the grain then this will have to come out in smaller pieces but this is no real drawback.





To finish the grooves smoothly, take a sheet of fine glasspaper and wrap it round a piece of iron or a ruler that just fits nicely into the groove and rub a few times backward and forward. It will be found that the continual running of vehicles will also improve the finish, the wooden surface eventually being as easy running almost as metal.

It is a good plan to take an old vehicle, say an old locomotive mechanism, and with wheels locked rub it along the tracks. This helps to give a smooth surface.

#### Inset Rails

Should the tracks not be wanted for a big layout, inset rails can be made in the same lengths as tinplate (Fig. A) but it must be remembered that where the flangeways meet ordinary rail they must be "winged" that is rounded as (B) so that the wheels may ride easily into the grooves.

A way of finishing the ends of inset sections is shown in Fig. C, the two rails being made to stand out by bevelling down the end of the surrounding wood with a sharp chisel. This is not recommended unless the grain is running exactly the same way as the rails. It is very effective though.

To bring inset rails fitting down to ground level, as at level crossings, or any other place where a high edge would look ridiculous, ramps must be used as (D).

#### Crossing Tracks

The crossing of tracks is very easily effected by the groove method (E) the flangeways] merely

being cut upon one another at the desired angle, but great care must be taken in the cutting, as there are several fine angles of wood at the actual intersection that can be easily broken and repairs are rather hard.

Now as to laying and painting the track, when tinplate is joined to the wooden rail the ends of both must be screwed down to a base board and adjusted till they are exactly the same level, or a small section of three-ply can be secured and made to project as (F) this is quite enough for a screw through the sleeper of the tinplate track just to catch in, and prevent sideways movement.

#### Suitable Finish

The tracks may be finished all over in dull grey to resemble concrete. This is quite effective when the 'rail tops' are shown by the simple process of rubbing a lead wheel along the track a number of times till a distinct mark is produced. This mark of course comes in time by the running of trains in the ordinary way but this method is quicker.

A more elaborate finish is shown in Fig. H, and a more elaborate one still in the photograph. Here slight cuts are made at (b), the positions that would be the outer edges of the rails. The rails are left plain wood for the moment (in time they get the 'run-in' appearance) but all the other areas are painted with a thin glue, over which is powdered any finely ground grey stone. The glue painting should be carefully done so that the edges along (b) may be straight.

## HOBBIES LEAGUE CORRESPONDENCE CLUB

*These Members of Hobbies League would like to get in touch with other readers and so form pen friendships which will undoubtedly prove interesting to all. In this way, one has a wide circle of friends and increased knowledge in people and places, not only in one's own country, but all over the world. Members should write direct to the addresses given, stating their full address and age, adding any hobbies in which they are interested. Hundreds of members have already taken advantage of this Correspondence Club in this way and others who wish to do so should notify the Registrar with the necessary particulars.*

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P. K. Thomas.	13, Cambridge St., Barry, Glam.	Anywhere, 15-18 yrs.	Scouting or Fretwork, Boating and Wireless.
K. H. Biermann.	Prinz-Heinrich-Strasse 11, Kiel, Germany.	Anywhere.	Anything.
Mohamed Wasiullah Khan.	c/o Babu Md. Nasin Khan, Postal Clerk, P.O. Jodhpur, Marwar.	Gt. Britain.	Anything.
J. Scott.	6, Allars Cres., Hawick, Scotland.	America or S. Africa.	Keeping Mice and other Livestock.
D. M. Riggs.	38, Sydenham Rd., Knowle, Bristol, 4.		Fretwork, Scouting and General Topics.
B. Penrose.	3, The Ambassadors, Von Weilligh St., Johannesburg, S. Africa.	England or Canada.	Fretwork, Photography, Chemistry and Electrical Experiments.
R. S. Challender.	8, Albany Rd., Southport, Lancs.	England (10-14 yrs.).	Stamp collecting preferably.
T. C. S. Khatnalwala.	Aling St., Thapda Pole Opp. Desawal's Wadi, Cambay, India.	Anywhere.	Anything.
B. Saunders.	12, Princes Mansion, Jetty Rd., Glenelg, South Australia.	Anywhere.	Stamp collecting.
G. H. Dallimore.	45, Milford Rd., Landport, Portsmouth.	Anywhere.	Model making and Sea Travel.
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K. Laughlin.	81, Victoria St., Ipswich, Suffolk.	Anywhere.	Anything.
D. J. Bewin.	33, Cardiff Rd., Pwllheli, N. Wales.	Any British Colony (15 yrs.).	Anything.
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# MYSTERIOUS PUZZLE JOINTS

**F**EW people can resist an attempt at unravelling what appears to be a mystery at a first rapid glance. Puzzles are always sources of interest and amusement and can be produced at any time when things are dull.

They are doubly interesting if they are products of our own skill with tools. The making of any of the puzzles shown is a good test of our patience and workmanship.

The first example shown is an old favourite with woodworkers and requires some skill and care in the setting out and cutting of the parts. As will be seen from the illustrations it is a sample of the dovetail joint.

This example, however, is of no practical use as it joins to pieces of wood the grain of which runs in the same direction. It is merely a very interesting curiosity.

## A Strange Dovetail

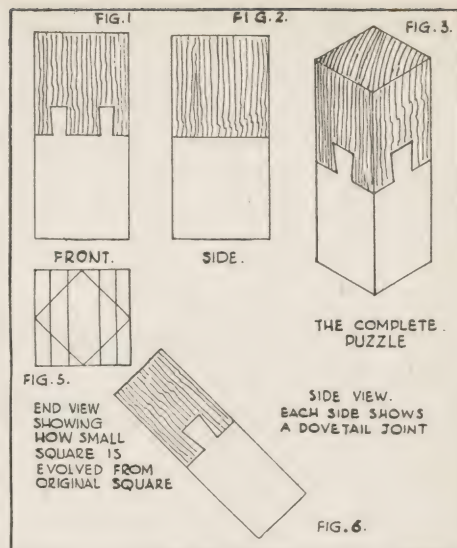
If we examine Figs. 3 or 7 we see that a proper dovetail is shown on the two faces seen. The two opposite sides are similar. That is, all four sides show a proper dovetail.

At a first inspection it looks quite impossible to take the pieces apart, and no clue is afforded showing how they have to be united.

The construction is as follows. Take two pieces of wood 3ins. or 4ins. long and 2ins. square. They should be dressed up squarely all round. They may be of contrasting colours, as this shows the joint to better advantage.

The ends to be joined are made dead square. Now the pins are marked out and the joint is cut neatly. The parts are knocked together as shown at Fig. 1. The opposite side shows the same.

The other two faces show as Fig. 2. Lines are



drawn down the centre of each face and when the points are joined on the ends a smaller square results Fig. 5. The wood at A, B, C and D in Fig. 8, is now removed.

The result will be that the puzzle will now appear as shown at Fig. 3 when assembled, and Fig. 7 when the pieces are apart.

To separate the two pieces move in opposite directions from corner to corner.

## Square and Round

The next example is very simple, Fig. 9. Usually it is said it is impossible to completely fill up a square hole with a round peg.

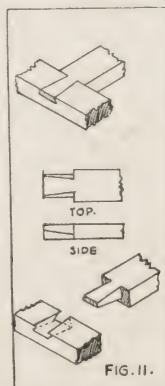
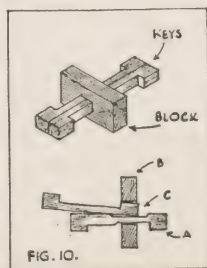
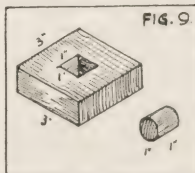
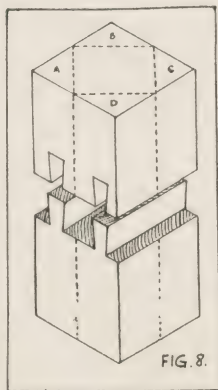
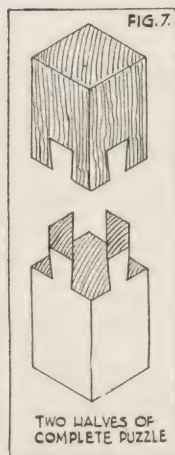
The parts of this are a piece of wood 1in. square with a square hole cut through it. The plug is 1in. in diameter and 1in. long. This is very simple to solve.

The third example (Fig. 10), does look a marvellous piece of construction. It consists of a piece of wood with a hole mortised through it. This can be made of any hard wood. The keys

should be made of oak, and may be 6ins. long and 1in. square.

Pieces with the annual rings running across are most suitable. Pieces having the annual rings running diagonally should not be used.

The block should have 1½ in. square hole mortised right through. Now shape one of the key pieces. The sliding portion of this should measure 1in. by ½ in.





The other key piece is put into an iron vice and pressed gradually until it is only about  $\frac{3}{4}$  in. thick. It is then cut to shape. The first key A should also be compressed as shown. The two keys will then be found to enter as shown.

The portions that have been compressed are then soaked in boiling water and heated at the fire. The compressed parts will come back to their original shape.

The puzzles are trimmed and all cleaned up.

The fourth puzzle is much simpler in construction and for it Fig. 11 is also self explanatory. The bottom of the tenon is bevelled upwards to allow it to slip upwards into position and show the dovetail on the upper face.

This can be made from  $1\frac{1}{2}$  in. material  $2\frac{1}{2}$  ins. wide or other suitable sizes.

Once they are made, such puzzles can often be brought out to amuse one's friends and while away an interesting half-an-hour after tea.



WITH the best intention in the world, to assist readers who send in photographic queries it is not always possible to give the full advice, owing to the very sketchy and vague way in which the queries are put, and also the lack of necessary details.

Of course we do not expect beginners always to know what details are required, but with a little thought some queries could be made a trifle clearer, with the result that they would get more precise and helpful replies.

Types of camera should if possible be mentioned, and care should be taken that the words used *do* actually describe the trouble, and do not have several interpretations.

It should be remembered that the word "film" now has several meanings. By itself it may refer to finished cinematograph pictures, to unexposed reels to go in a baby cine camera, to rolls that go into ordinary box and folding cameras, whilst the word is often used to describe a film-negative.

#### Use Definite Words

Or again the word "camera" by itself means nothing, as there are literally thousands of makes on the market. Other phrases and words as "not clear," "marks," etc. are equally vague. You can imagine how impossible it is to be really helpful when we get a query like "The pictures from my camera are not clear; why is this?"

With some indication of the type of camera and the nature of the lack of clearness, it would be possible to assist, but otherwise, no. In the case of failures it is always best to send a specimen if possible, as an expert eye can often see in a moment points that it would take reams of paper to explain.

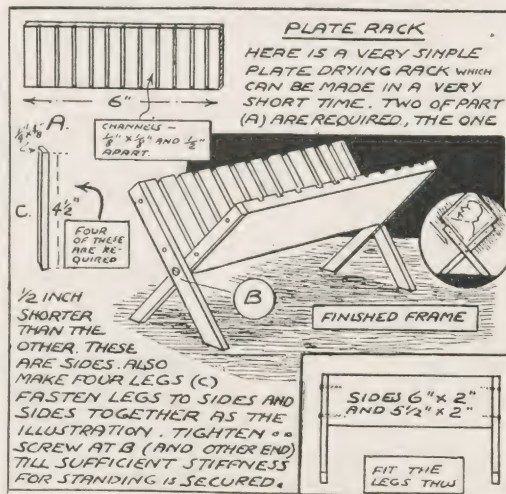
The great thing is to read your query over several times and try and imagine how it would sound to another person. Also, put in as many points of detail as you can. Such points are:—size of picture and make (if possible) of the camera, more accurate description of markings, the full description of the word "film," i.e. roll-film, cine-film, etc., and other things of this nature.

Questions, for your own sake, should be kept also very concise and clear-cut. Queries like:—"How do you do colour-photography?" are too wide for satisfactory answers, as one cannot hope to put into the form of a brief reply matter that occupies say two hundred pages in even the smallest text book.

Queries about purchasing goods too are rather impossible if you do not give some idea how much it is proposed to spend. We have often scratched our head over the type of letter that reads "I want to buy a camera to use this season. Can you give me some advice?"

However these questions are better than the vaguely worded type and it is against these, in their own interests, that we would warn readers.

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# MAKING A SENSITIVE BALANCE

A practical piece of work for those who dabble in chemistry, electricity, etc. who want an accurate measure.

AS a result of many requests from readers we are describing the construction of the chemical balance that was mentioned in an earlier article in this series. Some years ago we made a small balance after the pattern of the common "Student's Laboratory Balance" to weigh up to 250 grammes. This served its purpose admirably, the only part that was bought was the box of weights.

Because this balance was so successful we decided to make one, for the purpose of an article that would be both small and neat, and above all easy and cheap to make. Again, the set of weights is all that need be bought as most of the material can be obtained from the scrap box.

## The Theory

For a few lines we must explain the theory of a balance and its usefulness. Broadly it consists of a beam balanced on its centre and with a pan suspended from each end. A standard weight is placed on one pan and on the other the article whose mass it is desired to know.

The centre of suspension must be in the exact centre of the beam and not the centre as found by experimentally balancing the beam on a knife edge. If the beam is not symmetrical in all dimensions, then the centre of suspension will not coincide with the geometrical centre or the centre of suspension as found by measurement.

Say we balance up a beam that is "out of centre," i.e. not symmetrical. Place a 20 grammie weight in one pan and a 20 grammie in the other. The beam no longer balances because of the difference between the point of suspension of the beam and the point at which the pans are hung.

This can be illustrated in a similar way. Weigh out 20 grammes of a powder, and then change the powder over and place on the weight pan. If the beam is incorrect there will be no balance, i.e. the powder is either too heavy or too light.

This point must be borne in mind when marking out the beam; use great care and work to the narrowest possible limits. The actual balancing can be done afterwards by the adjusting screws, but this should not be necessary on a well made piece of apparatus.

## Suspension and Balance

The second point is that the vertical distance between the point of suspension of the pans and of the balance must be kept small. If the three points are symmetrically placed along a symmetrical beam all will be well, but here we are forgetting

the effect of the pans which considerably lowers the centre of gravity of the beam.

If the centre of gravity is too low the sensitivity of the balance is too low. On the other hand if they are too far above, the balance will never balance but always tumble to one side or the other.

As a result we place the point of suspension of the beam a little below that of the pans, the actual distance depending on many factors.

## Up to 50 Grammes

This is a small balance to weigh up to 50 grammes or slightly more. The sensitivity will depend solely on the skill and patience of the maker. This is specialized work, but the veriest amateur can, if these notes are followed, meet with a fair degree of success.

We will start with the base and build up from this. The original balance was fitted with levelling screws, but for general purposes this can be omitted as long as the balance is used on a fairly level bench.

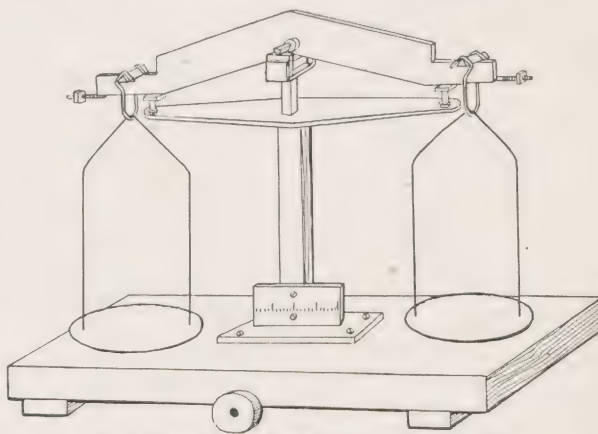


Fig. 1—The completed balance as described

The base should be of good hard oak about  $\frac{1}{2}$  in. thick and to be finished off well. The column is a piece of conduit or other tube  $\frac{3}{4}$  in. in diameter and about  $4\frac{1}{2}$  ins. high. Any tube may be used and we recommend brass, as this is used in general instrument work and looks very professional when properly finished. The column is sweated in the centre of a  $\frac{1}{16}$  in. brass base with counter-sunk holes at the corners for  $\frac{3}{4}$  in. brass wood screws.

The tube may be soft soldered or brazed in position, the latter to be preferred. Having centred the tube, cut a square hole in the centre of the brass to take the beam supporting rod.



This is a square  $\frac{1}{4}$ in. brass rod that slides freely in the hole, but not too freely, on the head of the rod the actual edges for suspension are mounted. The raising and lowering of the beam is through the usual disc crank method. Details of all this are shown at Figs. 1 and 2.

It will be necessary to cut a small recess in the base of the balance to accommodate this gear and it is for this reason that the brass is made large enough to cover any hole.

### Gear Shaft

The shaft that works the gear runs on two small bearings screwed under the base, just strips of brass bent round  $\frac{1}{8}$ in. round brass rod. The disc is of  $\frac{1}{16}$ in. brass and has  $\frac{1}{8}$ in. diameter round pin soldered at right angles to its face. The pin should be a drive-in fit into a hole in the disc, the solder merely holding it in place. Drill a  $\frac{1}{16}$ in. hole through one end of the beam pillar and then cut a slot at right angles to this with a fine hacksaw blade. This is the big end of the pillar.

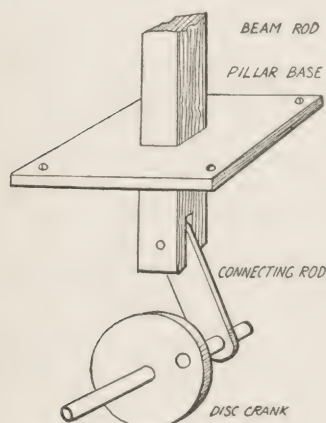


Fig. 2—The raising mechanism

Now the connecting rod size is best determined by experiment and should be of such a length that a half turn of the shaft causes the pillar to rise about  $\frac{1}{2}$ in. The shaft must turn so the crank pin just passes the vertical point it then rests on a stop, a wood screw, and holds the beam up.

Cut the connecting rod from thin brass and secure in the pillar rod by means of  $\frac{1}{16}$ in. wire rivet, it will not slip off the pin (see Fig. 2).

The arm rest is also cut from  $\frac{1}{16}$ in. brass and is soldered to the top of the pillar. It has a similar  $\frac{1}{4}$ in. square hole in the centre to guide the rod. To make a  $\frac{1}{4}$ in. hole drill a  $\frac{3}{16}$ in. hole with the machine and then file the edges and corners out with a small Swiss file, polish the inside of the hole so that the beam travels up and down without rattling the pans.

### Beam Supports

The beam rests are two small  $\frac{1}{8}$ in. diameter brass screws tapped into the end of the arm and fitted with lock nuts. The heads should be filed flat (see Fig. 3).

Now comes the difficult part of the work—the

making of the glass planes for the knife edge to ride on. Actually, this work is quite simple, but when done well it gives a really professional touch to the finished balance.

### The Head

The head consists of a small double bracket made from sheet brass, and in its centre a nut is soldered and the end of the pillar rod threaded to take this nut. Arrange the length of thread and position of the nut to place the head in the correct position. Cut two squares of glass about  $\frac{3}{32}$ in. thick to project slightly above the brass bracket.

Arrange horizontally and if necessary grind them to fit. One square is placed at each end of the bracket and they are kept apart by a brass spacer from  $\frac{1}{4}$ in. rod. This should be cut slightly larger than will go into the space and then ground down until it is a push fit. Grind the top edges of the glass quite flat.

Cement the whole up with Canada Balsam and allow to set for a week. If no Balsam is available then use a commercial glue. When set, fit the

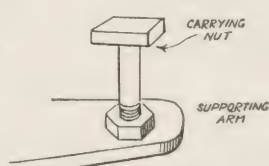


Fig. 3—The beam rests

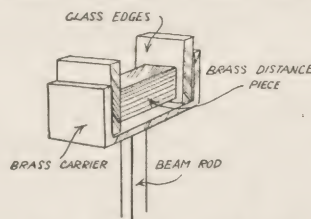


Fig. 4—The supporting bead

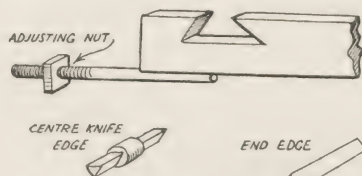


Fig. 6—Details of edges, and beam, etc.

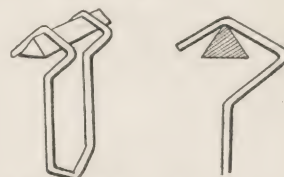


Fig. 7—The pan supports



Fig. 5—Shape and details of the beam

complete head on the balance rod, and by holding this vertically grind both the glasses flat. Polish by using whiting, and finally rouge.

The grinding is done on a flat surface with a fine abrasive paste, a few strokes are all that is necessary to get both surfaces plain. The polishing is the tedious part and may be dispensed with unless you are making an exhibition balance. For extreme sensitivity the edges must be polished.

### Ready for the Beam

The idea of polishing both edges together after being cemented is to make it easier to get them both parallel and level. Use the abrasive on a sheet of plate glass or metal and use carborundum (see Fig. 4).

(To be Continued)





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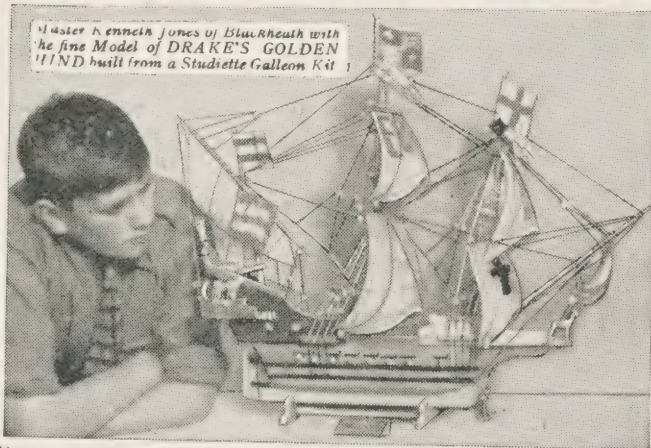
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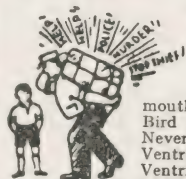
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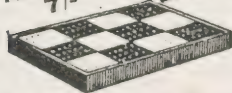


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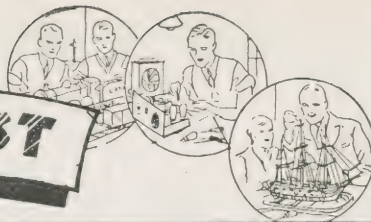
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## REPLIES OF INTEREST



### Bird Mounting Materials

**W**HAT sort of material is used for mounting birds on? What is used as imitation twigs covered with moss, imitation rock, etc.?—(R.S.)

**U**SUALLY taxidermists use actual dead twigs or fresh twigs like holly whose leaves have been removed, and the twigs allowed to die, so that they will not be so brittle as natural "dead" wood. For moss, either use the artificial moss sold in florists and toy shops, or crayon it on with grey, etc. crayons, using if possible natural moss-covered twigs for a copy. To include rock in a bird mount, you can either use pieces of natural rock, or if these are too heavy, sandstone can be made from folded sandpaper or from a piece of wood covered with glasspaper. Some naturalists paint a piece of wood to a rock-like colour and fasten lichens, etc. from the natural countryside which still keep some natural appearance even when dead. For imitation grass, etc. that must keep green, you can best use the ordinary artificial grass, ferns, etc. sold at florists shops, or the little pieces of artificial grass matting used to make up "lawns" in shop window dressings. It is well to include also a few small dead fronds of bracken fern, obtained from any wood, for these give a natural touch in their withered yellow appearance. All vegetation used in a case should be perfectly dried beforehand or the damp will induce moulds to appear. Many natural rushes, sedges and hard grasses can be dried and pressed for use.

### Making Papier Mâché

**W**OULD you forward me instructions for making papier-mâché articles?—(C.E.C.)

**F**OR making articles in papier-mâché, ordinary newspaper can be used. Tear the newspaper into rough squares, not larger than 4ins. each way, and leave to soak in water for two to three hours. Remove from water and drain. For the paste, beat up some

flour into a smooth batter and pour on boiling water, stirring until the paste thickens. Add a few drops of oil of cloves and use cold. Innumerable shapes can be used as moulds when more experience has been gained, but for a start a simple shape such as a plate or soup plate can be utilised. Lay the plate down and cover the underside with soft soap to prevent the papier-mâché sticking. Cover the surface with the square of paper, the edges overlapping, then apply a coat of paste and a second layer of the paper squares, but do not let the joints this time come directly over those beneath. Add several more layers, a coat of paste between each, until the total thickness amounts to  $\frac{1}{4}$ in. or more. Take care to get the thickness as uniform as possible over the plate, then leave to dry in a warm room. When the papier-mâché is quite dry and hard, remove from the mould and trim the edges. The inside surface should be smooth enough, but the outside may need some glasspapering to make it satisfactory. Give the whole a coat of hot size, and when set, two coats of oil paint. On this transfers can be applied as decoration if desired, then finish with a coat of transparent varnish. An alternative treatment is to first apply a coat of paint, then several coats of coloured lacquer. It all depends on what the finished articles are intended for. If only for ornament, the treatment mentioned can be given, or in the case of a plaque such as a cast made from a soup plate could serve for, a photograph could be pasted in the centre, the outside painted and varnished all over. For dishes, etc. required to hold water or other liquids, cellulose enamel could be used with satisfactory results.

### Oil in Polishing

**I**HAVE two books on french polishing. One of them says that raw linseed oil should be used for "oiling," the other says that boiled should be used. Can you tell me which should be used with Hobbies Lightning Polish? I do not want to make the wood

any darker in appearance if it can be helped. The two books also hold different opinions about oil polishing. Can you tell me the best oil to use?—(G.K.D.)

**I**F wood is oiled prior to french polishing it is usually done with the idea of darkening the wood and enriching its natural colour and the beauty of the grain. For this purpose raw linseed oil is used. As you say you do not wish to make the wood any darker, I should advise leaving out the oiling and giving in its place a thorough rubbing with wax polish made up of beeswax dissolved in turps until it is of the consistency of boot polish. This will also act as a "filler" and when it is dry, the work can be polished with a dry cloth, then the surfaces polished in the usual way. The idea of oil polishing is usually to obtain a surface that will not be marked by heat. One of the ways of doing this is as follows. French polish the surface and when dry, rub down with fine glasspaper until most of the polish is removed. Simmer some raw linseed oil over a low gas for about 15 minutes, then add turps in the proportion of one part turps to four of oil. Apply this mixture with a pad daily for seven or eight days and you will get a good dull polish. Rub this down lightly with pumice stone and water, then polish, using boiled linseed oil and tripoli powder—this is rather a long job, but will give very satisfactory results.

### Steam Tender

**P**LEASE send me the dimensions of a steam boat, something like the tenders of the "Imperial Airways" flying boats, for a steam engine 6 $\frac{1}{2}$ ins. by 3 $\frac{1}{2}$ ins. or 5 $\frac{1}{2}$ ins. by 3 $\frac{1}{2}$ ins.—(A.F.)

**S**UITABLE dimensions for the hull of a model steam yacht to be driven by an engine 6 $\frac{1}{2}$ ins. long, 3 $\frac{1}{2}$ ins. wide would be as follows. Length 30ins. Beam (greatest width) 5 $\frac{1}{2}$ ins. Depth from deck to bottom of keel 3 $\frac{1}{2}$ ins. to 4 $\frac{1}{2}$ ins. according to height of your engine.



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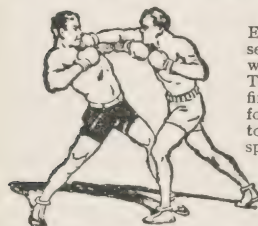
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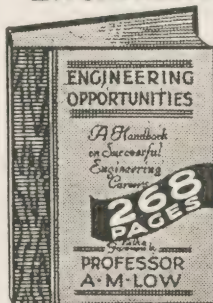
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Everyone should realise the seriousness of Rupture, even where the protrusion is small. The Brooks Appliance is the finest kind of mechanical support for Rupture that it is possible to build. Hard pads and stiff springs are entirely eliminated. Our Automatic Air Cushion, light, cool and absolutely sanitary, is protected by patents in the British Isles and all important foreign countries.

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# HANDY VEGETABLE RACK

THIS handy vegetable stand will commend itself to the housewife or domestic help who likes to have a place for everything and keep everything in its place. It is simple in construction as an examination of drawings will show.

Two pieces 1ft. 6ins. by 2ins. by 2ins. are shaped as shown for the feet. The posts are 1½ins. by 1½ins. These are mortised to the feet. The shaped struts (Fig. 8), are from 2ins. by 1½ins. material. These are also mortise and tenon jointed to the feet and posts. The four rails 1½ins. by 1½ins. are prepared and similarly fixed to the posts.

They are held securely by the wedges. The outside sizes are shown on the drawing at Fig. 1.

The shaping at the top ends of the posts is shown at Fig. 5. When the stand has been glued up it can be cleaned and sandpapered.

The three containers can now be made. These are from ½in. material, the bottoms being of plywood screwed to the sides and ends. The top

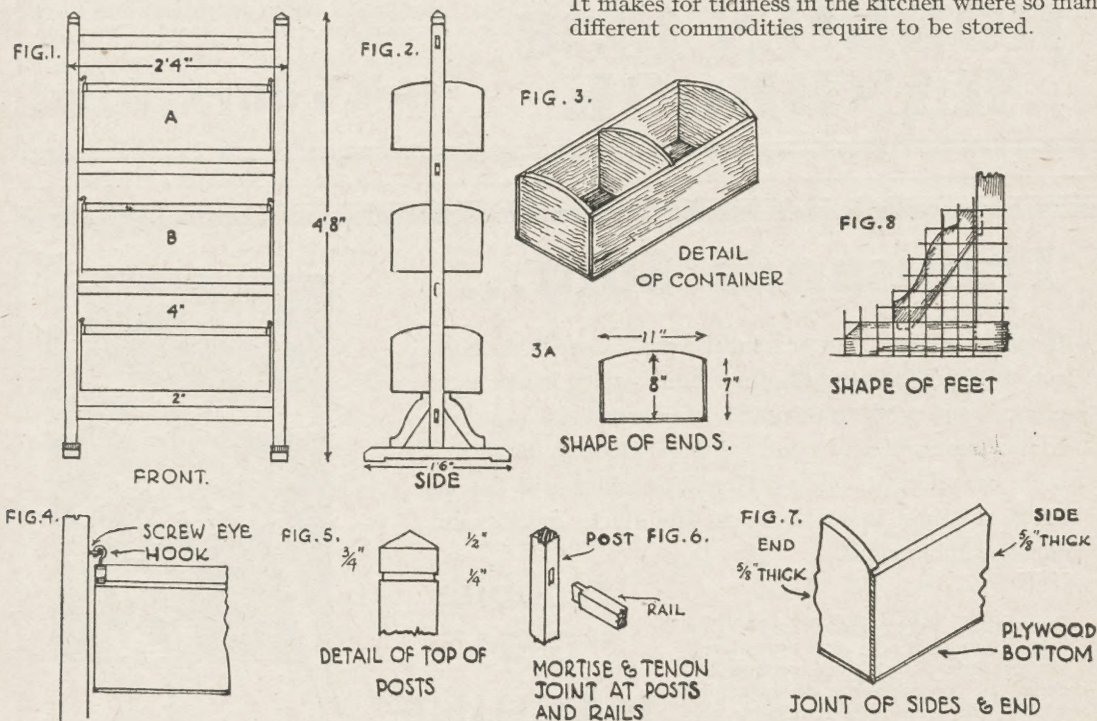
ends of the sides are shaped as at Figs. 3 and 3a.

The sides are rebated about 3/16in. to take the ends. The two upper containers have a central division of ½in. material. This is let into the sides about ½in. The sides and ends are cleaned up and then securely nailed together.

After this the bottoms are fixed with suitable screws. Hooks are screwed in the ends at the central points. Screw eyes are inserted at suitable points on the insides of the posts.

The hooks and screw eyes are adjusted to engage easily (Fig. 4). The containers should be about ½in. less in length than the distance between the insides of the posts. The corners of the containers could of course be dovetailed if desired, though it curtails much more work. This will be found a useful stand for holding potatoes in the lower container and other vegetables in the two upper ones.

The whole may be stained or painted as desired. The stand can be made of either red or white deal. It makes for tidiness in the kitchen where so many different commodities require to be stored.



## Folding Table—(Continued from page 492)

It is a good idea to drive four round nails into the ends of the legs for a distance of an inch and to cut them off so that a short stump of each nail projects beyond the leg. If the ends are then filed to points they can be fixed in the grass to make the table more rigid still.

If you wish to cut it in oak or mahogany, or

any particular fancy fretwood, Hobbies Ltd. will be pleased to give you the price of a complete parcel.

### CUTTING LIST

Top.—1 piece 20ins. by 10ins. by ½in.  
 Flaps.—2 pieces 20ins. by 5ins. by ½in.  
 Legs.—1 piece 18ins. by 10ins. by ½in.  
 Loose rail.—1 piece 22ins. by 1in. by ½in.





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## **Get Yours Now !**

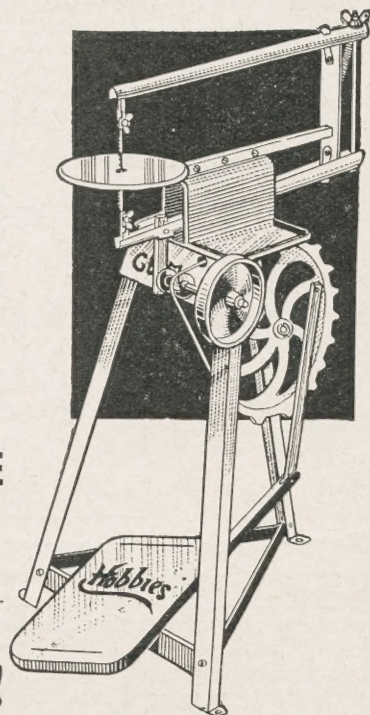
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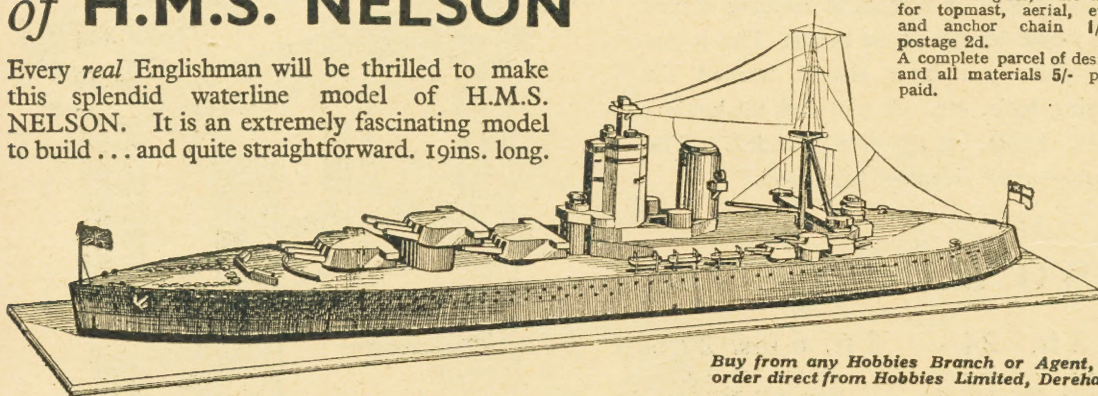
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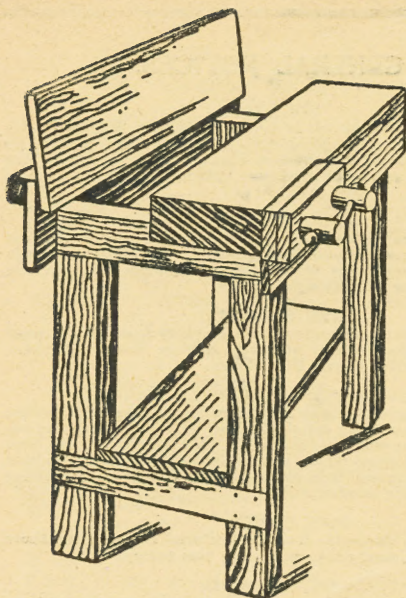
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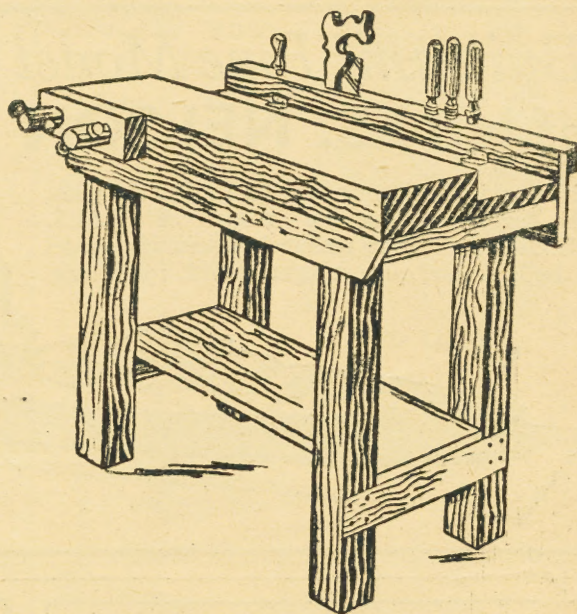
**3 ft. 24/-**

2 ft. 6 ins. high, 1 ft.  
4 ins. wide with 12  
in. double-screw  
wooden vice.

**3 ft. 6 ins. 27/6**

2 ft. 8 ins. high, 1 ft.  
8 ins. wide, with 15  
in. double-screw  
wooden vice.

*Carriage Forward*



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Notice the sturdy legs, cross-rails and top.

A bench like this will give years of service.